NATURAL HISTORY MISCELLANEA

Published by
The Chicago Academy of Sciences
Lincoln Park - 2001 N. Clark St., Chicago 14, Illinois

No. 10 October 20, 1947

Notes on the Eggs and Early Larvae of Three Florida Salamanders

COLEMAN J. GOIN*

The following notes are presented to help fill some gaps in our all too fragmentary knowledge of salamander life histories.

The structural details of the eggs of *Pseudobranchus striatus axanthus* and *Siren lacertina* have been described by Noble and Richards (1932, **p.** 14-16; fig. 5 A, B) from eggs which they obtained by inducing females to lay by means of pituitary implants. Netting and Goin (1942, p. 191) described a single egg and its contained embryo of *P. s. axanthus.* Neither the eggs nor early larvae of *Pseudotriton montanus floridanus* have been described.

Pseudotriton montanus floridanus Netting and Goin

A single clutch of twenty-seven eggs of *P. m. floridanus* was found about four miles north of Gainesville, Alachua County, Florida on January 14, 1947. The area in which the eggs were found is a boggy, sphagnum-filled, seepage area surrounded by saw palmetto-slash pine flatwoods. The seepage gives rise to a small, clear stream which flows through the flatwoods and enters a swampy area.

The eggs were suspended in clusters ranging from two to eight to tiny rootlets hanging from a large root at the edge of an undercut bank. The root was about one-half inch above the surface of the water and the eggs were attached by stalks to the rootlets which hung down into the clear, cool water.

A single female was found with the nest. She had eighteen costal grooves (including an indistinct axial), a snout-to-vent length of 58 mm. and a total length of 100 mm. Both the right and left oviducts were enlarged and both were entirely devoid of eggs. The ovaries were spent and reduced.

The eggs were near hatching stage and about half of them hatched before they were brought back to the laboratory. Several of the remaining eggs

*Department of Biology, University of Florida, Gainesville.

were preserved and the rest were placed in a finger bowl full of water where they hatched the next day.

The live newly hatched larvae would settle slowly and come to rest on the bottom, usually on their backs or sides. When disturbed they would dart about rapidly for a few moments and then again come to rest on the bottom.

Description of the newly hatched larvae: The fore digits are developed, four distinct fingers being present. Three digits are discernible on the posterior limb in the form of small buds. The head is broader than the body, not particularly depressed. Snout rounded at tip. Eyes medium in size, dorsolateral in position, nearer angle of jaw than tip of snout. Nostrils tiny, widely separated, situated near tip of snout; nasolabial groove indistinct. Three pairs of external gills; gill rami about equal to fore-limbs in length, with unbranched filaments along lower border. A deeply concave, unnotched opercular fold across throat. Body and tail compressed. Tail fins well developed, originating above posterior limbs.

Top of head, dorsum, and sides with numerous, thickly spaced melanophores, giving a salt-and-pepper pattern. Chin, throat, venter, and ventral tail fin immaculate.

In snout-to-vent length eighteen of the larvae range from 7.5 to 9.0 mm. and in total length from 12.0 to 13.5 mm.

Two adult females collected at the same locality on February 22, 1947 have the oviducts enlarged and the ovaries packed with immature eggs.

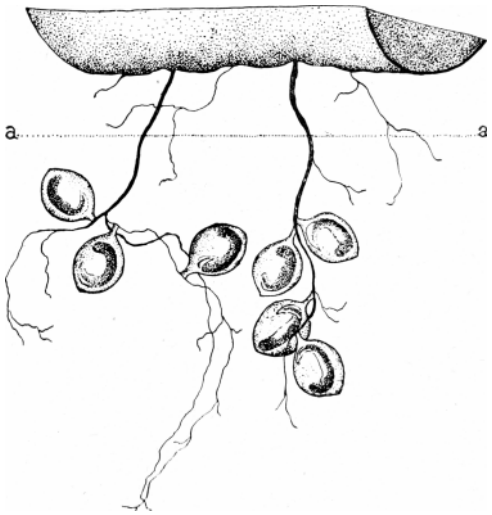
Recently hatched larvae were collected on January 14 and February 22, 1947. On January 14 a series of sixteen larvae were taken which ranged in snout-to-vent length from 34 to 39 mm., with the exception of a single individual which was only 31 mm. A single larva 38 mm. in snout-to-vent length was collected on February 22.

Pseudobranchus striatus axanthus **Netting and Goin** I

have collected fifteen eggs of *P. s. axanthus* as follows:

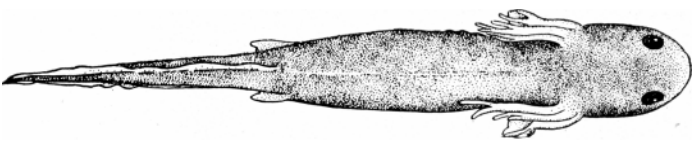
1 - Mar. 31, 1941; Alachua Co., 4 miles east of Gainesville, Newman's Lake.
11 - Nov. 27, 1943; Alachua Co., about 5 miles southeast of Gainesville, River Styx.
2 - Feb. 10, 1944; same locality.
1 - Mar. 21, 1947; Alachua Co., 4 miles east of Gainesville, Newman's Lake.

The habits of *P. s. axanthus* make it very difficult to collect the eggs. They are deposited singly on the roots of the water hyacinth *(Piaropus erassipes).* In no case have I seen more than one egg on a single plant and usually they are not even on neighboring plants. On the one occasion when eleven



1

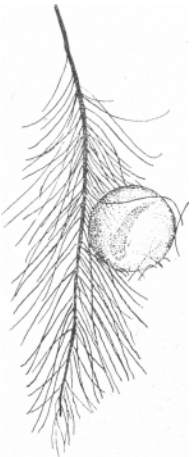
2



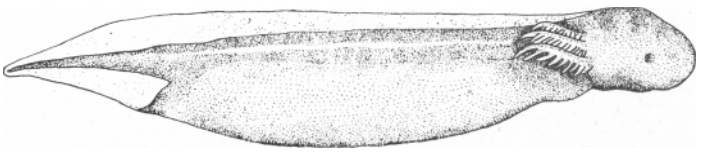
3

1—Showing method of attachment of eggs of *Pseudotriton montanus floridanus*. *a*--*a*, water level)

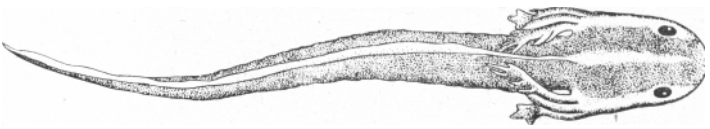
2, 3—Lateral and dorsal views of newly hatched larva of *P. m. floridanus*. Actual size 13.5 min.



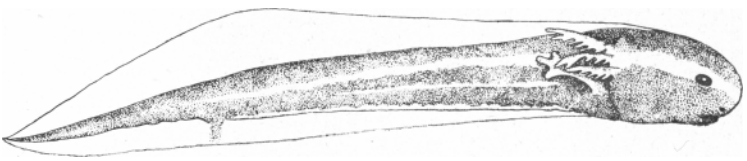
4



5



6



4—Egg of *Pseudotriton striatus axanthus* attached to water hyacinth root.

5—Lateral view of newly hatched larva of *Siren lacertina*. Actual size 16.0 mm.

6, 7—Dorsal and lateral views of newly hatched larva of *P. s. axanthus*. Actual size 15.5 mm.

eggs were collected in one day, they were widely scattered and the series was obtained by four of us collecting for a period of several hours.

The eggs are round, adhesive, and without stalks. They adhere to the filamentous roots of the hyacinth and are usually placed from six to twelve inches below the surface of the water. On numerous occasions I have spent several hours searching diligently for them without results.

The eggs, including envelopes, vary from 7.0 to 9.0 mm. in diameter. The single egg found on March 21, 1947 was at the neural groove stage when collected and hatched seventeen days later on April 7. Of the series of eleven collected on November 27, eight that were left alive hatched on dates ranging from November 28 to December 10.

Description of the newly hatched larvae: Three well developed digits, without horny caps, are present. Head broad, slightly depressed; snout bluntly rounded at tip. Eyes small, more lateral than dorsal. Nostrils small, near tip of snout. Three pairs of external gills; gill rami about equal to head in length; each ramus with two rows of unbranched filaments along lower border. Opercular fold across throat with shallow median notch. Body and tail strongly compressed. Dorsal, caudal, and ventral fins well developed; dorsal originating at base of head, ventral originating at level of axillae.

Head and body conspicuously striped; ground color dark brown, stripes creamy. A single dorsal median stripe on top of head and body extending from region anterior to eyes posteriorly onto dorsal fin. A pale stripe on each side of head extending from above the nostril posteriorly through the eye to the base of the median ramus. A prominent lateral body stripe extending from base of median ramus to base of tail. A poorly developed ventrolateral body stripe extending posteriorly from base of leg for about two-thirds the length of the body. No midventral body stripe anterior to ventral fin.

Six newly hatched larvae range in snout-to-vent length from 10.0 to 11.5 mm. and in total length from 14.5 to 16.0 mm.

Siren lacertina Linne

The only time I have seen eggs which were undoubtedly those of *Siren lacertina* was when Wm. M. Beck brought me five which he collected on February 4, .1947 in Biven's Arm, about three miles south of Gainesville, Alachua Co., Florida. He informed me that he dipped the eggs up in a dip net about three feet from shore where the water was about six inches deep. They were taken from a bed of *Myriophylum*. The habitat is a shallow ditch, entirely devoid of hyacinths, which is connected with the main body of the lake.

The eggs were placed in a finger bowl of water to hatch, and although four of them had apparently been injured in transit and died, the fifth hatched on February 6, 1947.

Description of the newly hatched larva: The digits are not differentiated and the limb tapers to a blunt point. Head small, wider than body, not flattened. Snout rounded. Eyes small, not distinct, lateral in position. Nostrils tiny, ventral. Three pairs of external gills; rami about as long as head, each with two rows of filaments along the lower border. Distinct opercular fold across throat, broadly rounded, without median notch. Body and tail strongly compressed. Dorsal and caudal fins well developed. Dorsal originating at base of head, caudal extending anteriorly on ventral side to vent.

General color a pale grey with a dim, poorly developed lateral light stripe extending from base of gill ramus to base of tail.

Snout-to-vent length 13 mm.; total length 16 mm.

From the above descriptions and accompanying figures it can be noted that the newly hatched larva of *Siren lacertina* is, in general, similar to the newly hatched larvae of *Siren intermedia nettingi* as described and illustrated by Noble and Marshall (1932, p. 5-6, fig. 2 B) whereas the larvae of *Pseudobranchus striatus axanthus* are in a more advanced state of development with well differentiated digits, well developed color pattern, and more reduced abdomen.

The method of deposition of the eggs of *Pseudotriton montanus floridanus* seems to be similar to that of *P. m. montanus* as described by Fowler (1946, p. 105).

LITERATURE CITED

Fowler, James A.

1946 The eggs of *Pseudotriton montanus montanus.* Copeia, 1946, no. 2, p. 105.

Netting, M. Graham and Coleman J. Goin

1942 Descriptions of two new salamanders from peninsular Florida. Ann. Carnegie Mus., vol. 29, art. 6, p. 175-196, pl. 1.

Noble, G. K. and B. C. Marshall

1932 The validity of *Siren intermedia* LeConte, with observations on its life history. Amer. Mus. Novitates, no. 532, p. 1-17, fig. 1-4.

Noble, G. K. and L. B. Richards

1932 Experiments on the egg-laying of salamanders. Amer. Mus. Novitates, no. 513, p. 1-25, fig. 1-7.